Commonwealth of Kentucky
Division for Air Quality

PERMIT APPLICATION SUMMARY FORM

Completed by: Ben Markin

GENERAL INFORMATION:

Name:	Louisville Gas and Electric Company
Address:	220 West Main Street, Louisville, Kentucky 40232
Date application received:	December 1, 2004
SIC/Source description:	Electric Services
Source ID #:	021-223-00002
Source A.I. #:	4054
Activity #:	APE20040003
Permit number:	V-02-043 Revision 2

APPLICATION TYPE/PERMIT ACTIVITY:

[] Initial issuance
[x] Permit modification
__Administrative
_ _Minor
_x_Significant
[ ] Permit renewal
[ ] General permit
[ ]Conditional major
[x] Title V
[ ] Synthetic minor
[x] Operating
[ ] Construction/operating

COMPLIANCE SUMMARY:

[ ] Source is out of compliance
[x] Compliance certification signed
[ ] Compliance schedule included

APPLICABLE REQUIREMENTS LIST:

[x] NSR
[x] PSD
[ ] Netted out of PSD/NSR
[x] NSPS
[ ] NESHAPS
[ ] Not major modification per 401 KAR 51:017, 1(23)(b) or 51:052,1(14)(b)
[x] SIP
[ ] Other

MISCELLANEOUS:

[x] Acid rain source
[x] Source subject to 112(r)
[ ] Source applied for federally enforceable emissions cap
[ ] Source provided terms for alternative operating scenarios
[x] Source subject to a MACT standard
[ ] Source requested case-by-case 112(g) or (j) determination
[ ] Application proposes new control technology
[x] Certified by responsible official
[ ] Diagrams or drawings included
[ ] Confidential business information (CBI) submitted in application
[ ] Pollution Prevention Measures
[ ] Area is non-attainment (list pollutants):

EMISSIONS SUMMARY:

Pollutant	Existing Facility Actual 2004(tpy)	Source-wide Potential (tpy)
PM	558	3725.4
PM_{10}	160.3	3725.4
SO_2	4565.66	*13371.7
NOx	4127.90	*11375
CO	472.14	4325.9
VOC	56.41	234.6
LEAD	0.13	1.28
HF	13.7	25.8
HCl	139.26	154
Hg	---	0.043
H_2SO_4 mist	---	116.6

*Voluntary limits taken by permittee to ensure creditable net emissions reduction [401 KAR 51:001, Section 1, (146)], on any consecutive twelve-month total of nitrogen oxide emissions shall not exceed 5556 tons per year, sulfur dioxide emissions shall not exceed 4822 tons per year. **See below write up for clarification**.

CHANGES TO PERMIT (REVISION 2): - *MAJOR MODIFICATION*

Louisville Gas and Electric Company (LG&E), as operator, submitted an air permit application dated December 01, 2004, to construct a new 750 megawatt (MW) net nominal generating unit that will utilize supercritical pulverized coal (SPC) technology at its existing Trimble County Generating Station located west of Bedford in Trimble County, Kentucky. The new SPC boiler will be equipped with Selective Catalytic Reduction (SCR), Pulse Jet Fabric Filters (PJFF), a Wet Flue Gas Desulfurization (WFGD) System, and a Wet Electrostatic Precipitator (WESP). It will exhaust through two exhaust flues located within an existing common chimney and will be equipped for ASTM Grade No. 2-D S15 or equivalent fuel oil for start-up and stabilization. Existing equipment at the Trimble County Generating Station includes the following: a 500 MW (nominal rated capacity) pulverized coal generating unit (Emissions Unit 1), six 160 MW (nominal rated capacity) simple cycle natural gas combustion turbines (Emissions Units 25-30), a natural draft cooling tower, coal/limestone/ash/gypsum material handling equipment, three auxiliary boilers, an emergency diesel generator, and fuel oil storage tanks. The natural draft cooling tower, coal/limestone/ash/gypsum material handling equipment, and fuel oil storage tanks will have increased utilization when the new SPC boiler becomes operational. The new facilities that will be constructed as part of this proposed project will include the SPC boiler (Emissions Unit 31), a linear mechanical draft-cooling tower

(LMDCT) for Emissions Unit 1, a coal blending facility, dust collectors and dust suppression equipment on material handling operations, an ash barge loading system/fly ash silos, an auxiliary steam boiler, a backup diesel generator, and an emergency diesel fire water pump engine. The seven existing combustion units (Emissions Unit 1 and Emissions Units 25 -30) are not part of the proposed major modification, and have previously gone through Prevention of Significant Deterioration (PSD) review. The proposed project constitutes a major modification of a major stationary source as defined in 401 KAR 51:017, Prevention of Significant Deterioration of Air Quality. The proposed project will result in a significant net emissions increase, as defined in 401 KAR 51:001 Section 1(146), of the following regulated air pollutants: particulate matter (PM & PM_{10}), carbon monoxide (CO), volatile organic compounds (VOC), fluorides, and sulfuric acid (H_2SO_4) mist. The proposed project is not subject to PSD review for nitrogen oxides (NO_x) and sulfur dioxide (SO_2) based on contemporaneous and creditable emission reductions of NO_x and SO_2 from the existing PC boiler (Emissions Unit 1). The emissions reductions from Emissions Unit 1 will be such that there will be no significant net emissions increase of NO_x and SO_2 thus removing these two pollutants from this PSD review. In addition, the project will not emit lead above the significant emission rate for lead of 0.6 tons per year (tpy), set forth in 401 KAR 51:001 Section 1(221) and 40 CFR 51. Emissions from the project of hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds will also be below significant emission levels and are therefore not subject to PSD review.

The Trimble County Generating Station is located in a county classified as “attainment” or “unclassified” for each of the PSD applicable pollutants pursuant to 401 KAR 51:010, Attainment Status Designations. The Trimble County Generating Station is an existing major stationary source under the PSD regulations as defined in 401 KAR 51:001, Section 1(120). The proposed project meets the definition of a major modification and is subject to evaluation and review under the provisions of the PSD regulation for PM & PM_{10}, CO, VOC, fluorides, and H_2SO_4 mist. A PSD review involves the following six requirements:

1. Demonstration of the application of Best Available Control Technology (BACT).
2. Demonstration of compliance with each applicable emission limitation under 401 KAR Chapters 50 to 65 and each applicable emissions standard and standard of performance under 40 CFR Parts 60, 61, and 63.
3. Air quality impact analysis.
4. Class I area impact analysis.
5. Projected growth analysis.
6. Analysis of the effects on soils, vegetation and visibility.

Furthermore, the source will also be subject to Title V, Title IV Phase II Acid Rain and NOx SIP Call permitting. The Title V permitting procedures are contained in 401 KAR 52:020. The Title IV permitting procedures are within 401 KAR 52:020, Permits, 401 KAR 52:060, Acid Rain Permit, 40 CFR Part 76 and 40 CFR 97. NOx SIP Call permitting procedures are within 401 KAR 51:160. This Statement of Basis addresses the proposed conditions of the PSD/Title V permit and the Title IV Phase II Acid Rain permit. The preliminary PSD determination is also provided within this Statement of Basis for the Title V permit. This review demonstrates that all regulatory requirements will be met and includes a draft permit that would establish the enforceability of all applicable requirements. This review is to ensure that the source shall be considered in compliance with all applicable requirements as of the date of permit issuance for the applicable requirements that are specifically identified in the permit and specifically identified requirements that have been determined to not applicable to the source

Louisville Gas & Electric Company submitted a minor revision application to the Division on April 29, 2005 for a voluntary creditable decrease in emissions for the permitted Emission Unit 01, a 5,333 mmBtu/hr, pulverized coal-fired boiler installed in 1990. The creditable decrease in emissions will be 3,225 tons per year of sulfur dioxide. This permit will limit the twelve (12) month rolling total on the unit sulfur dioxide (SO_2) on the unit to 4,822 tons per year. The credible reduction is requested by the facility to net against future potential increase from the construction of the additional utility boiler (TC2). The practically enforceable creditable reduction is being done in accordance with new source review (NSR) rules. [401 KAR 51:001 and 401 KAR 51:017] Compliance with the emissions limit shall be demonstrated using continuous emission monitoring equipment which measures the emissions hourly and procedures required by 401 KAR 52:060 (acid rain program). The sulfur dioxide limit shall become effective January 1, 2006. A previous minor permit revision limited nitrogen oxide emissions from Unit 1 to 5,556 tons per year, a credible decrease of 1,485 tons per year. That limit was effective January 1, 2005.

Emissions Analysis

The new SPC boiler (Emissions Unit 31) is equipped with Selective Catalytic Reduction (SCR), Pulse Jet Fabric Filters (PJFF), a Wet Flue Gas Desulfurization (WFGD) System, and a Wet Electrostatic Precipitator (WESP). Additional processes at the facility will include a ASTM Grade No. 2-D S15 or equivalent fuel oil-fired auxiliary steam boiler (to operate 1,000 hours or less per year); a diesel emergency fire water pump engine (to operate 52 hours or less per year); a backup diesel generator (to operate 1,000 hours or less per year); new coal blending system and associated material handling equipment; increased utilization of existing material handling equipment; increased utilization of the existing natural draft cooling tower; a linear mechanical draft cooling tower (LMDCT) for Emissions Unit 1; increased utilization of the existing fuel oil storage tanks; and

an ash barge loading system/fly ash silos. Detailed descriptions of the plant processes and expected emissions at each emissions point and emissions unit are contained in the air permit application document (refer to Section 2.3 of the air permit application). In addition, hourly and annual emission rates and pollutant identification for each respective emission unit can be referenced from the application. Emissions were based on the maximum rated capacity of the proposed project, anticipated operating conditions, and 8,760 hours per year after control technologies were applied. The project's annual net emissions increases for PSD-regulated pollutants and mercury, as shown below in Table 3-1 and in Table 2-2 of the application, are calculated for anticipated conditions while operating at 100% load. Evaluations at 50% and 75% load were also performed as well as for three potential coal fuels.

TABLE 3.1 – Net Emissions Increase for PSD-Regulated Pollutants

Pollutants	**Net Emissions Increase (tpy)**
Carbon Monoxide (CO)	3,040.8
Nitrogen Oxides (NO_x)	38*
Particulate Matter (PM/PM_{10})	567.4
Sulfur Dioxide (SO_2)	39**
Volatile Organic Compounds (VOC)	97.8
Sulfuric Acid (H_2SO_4) Mist	116.6
Fluorides	6.8
Lead (Pb)	0.55
Total Reduced Sulfur	Negligible
Reduced Sulfur Compounds	Negligible
Hydrogen Sulfide	Negligible
Mercury (Hg)(non PSD pollutant)	0.043

* On January 4, 2005, the Division for Air Quality (Division) approved LG&E's minor permit revision that contained an enforceable emissions limit such that the consecutive twelve-month rolling total of NO_x emissions from Emissions Unit 1 shall not exceed 5,556 tpy. The emissions decrease for Emissions Unit 1 of 1,485 tpy of NO_x is realized as both contemporaneous and creditable. The proposed project is not subject to PSD review for NO_x.

** On May 2, 2005, the Division received LG&E's minor permit revision that contained an enforceable emissions limit such that the consecutive twelve month rolling total of SO_2 emissions from existing Emissions Unit 1 shall not exceed 4,822 tpy. The emissions decrease for Emissions Unit 1 of 3,225 tpy of SO_2 is realized as both contemporaneous and creditable. The proposed project is not subject to PSD review for SO_2.

As the notes to Table 3.1 indicate, LG&E has accepted a new lower limit on its allowable emissions of NO_x and SO_2 from the existing PC boiler (Emissions Unit 1). These lowered limits are less than Trimble's historical emissions and represent real reductions. These emissions reductions will offset nearly all of the NO_x and SO_2 emissions increases due to the proposed Project. Taken together, the emissions decreases at Emissions Unit 1 and the emissions increases due to the Project will result in a net emissions increase in NO_x of 38 tpy and in SO_2 of 39 tpy. This netting analysis is based on the operation of 8760 hours/year at the rated capacity. Actual emissions are expected to be much less. These net emissions increases are not considered significant under 401 KAR 51:001 Section 1(221). Therefore, the Project is not subject to PSD BACT review for NO_x and SO_2.

Pursuant to 401 KAR 51:017, the creditable emissions reductions from Emissions Unit 1 were determined by the difference between Emissions Unit 1's post-change enforceable emissions limits and the pre-change baseline actual emissions (BAE). For an Electric Utility Steam Generating Unit (EUSGU), the BAE is calculated as the emission rate, in tons per year, based on the actual emissions determined over a consecutive 24-month period during the 60-month period preceding the contemporaneous emissions change. Specifically, the baseline look back period for Emissions Unit 1 is the 60-month period preceding the date on which an enforceable permit limit for SO_2 and NO_x is taken, respectively.

Capital investment and increased operating and maintenance (O&M) costs are required to implement the reductions at Emissions Unit 1. For NO_x, LG&E will reduce NO_x emissions through a combination of increased removal efficiency and increased SCR operating time. For SO2, LG&E will decrease SO2 emissions through capital investments to increase overall WFGD removal efficiency. Additionally, for these reductions to be considered contemporaneous and therefore eligible for consideration in the netting analysis, they must occur within the period beginning 60-months before initiation of construction of the Project (construction of TC2 and associated equipment) and before the initial operation of the Project.

The Division has established that the change in method of operations for the existing Trimble County Generation Station is marked by the initiation of the change to Emissions Unit 1's NO_x and SO_2 emission limits by an enforceable permit action. Thus, the BAE for Emissions Unit 1 for netting purposes, on a pollutant-by-pollutant basis, begins 60-month period prior to, and ends on, the date of the enforceable permit action for NO_x and SO_2, respectively. Table 3.2 identifies the creditable decreases at Emissions Unit 1.

TABLE 3.2 – Creditable Emissions Decreases at Emissions Unit 1 (TPY)

	Baseline Actual Emissions	New Limits	Creditable Decreases
NO_x	7,041	5,556	1,485
SO_2	8,047	4,822	3,225

LG&E submitted to the Division two minor revision applications on November 29, 2004 and**,** May 2, 2005, to establish the new limits reflected in Table 3.2. Compliance with the new limits shall be demonstrated using continuous emission monitoring equipment and procedures required by 401 KAR 52:060 (acid rain program). The enforceable annual tonnage limit for NO_x will be achieved using the installed selective catalytic reduction (SCR). The enforceable annual tonnage limit for SO_2 will be achieved using the upgraded wet limestone flue gas desulfurization (WFGD) system.

In order to determine the net emissions increases for the proposed Project for NO_x and SO_2, the Division determined the contemporaneous period for the Project and identified all emissions increases and decreases that are contemporaneous and creditable pursuant to 401 KAR 51:001 Section (1)(146). The contemporaneous period for the proposed Project is the period 60-months prior to the start of construction through the period in which the Project starts operation. For this Project, the construction period is projected at 5-years, resulting in a 10-year period. The Division has concluded that no other creditable emission increases or decreases have occurred within the contemporaneous period for the Project. The Trimble County Generating System was most recently subject to PSD review in January 2001 for the construction of six simple cycle natural gas combustion turbine peaking units. Table 3.3 summarizes the PSD netting for NO_x and SO_2.

TABLE 3.3 – PSD Netting Summary (TPY)

	Emissions Unit 1 Creditable Decreases	Project Emissions Increases	Net Emissions Increase	Significant Emissions Rate*
NO_x	1,485	1,523	38	40
SO_2	3,225	3,264	39	40

* Significant emission rate as given in 401 KAR 51:001 Section 1(221)

Emission Unit 01- Emission Limitations:

Pursuant to 401 KAR 51:001, Section 1, (146), source has accepted a voluntary limit such that consecutive twelve month rolling total of sulfur dioxide emissions shall not exceed 4822 tons per year, which through this permit is enforceable as a practical matter.

Compliance with sulfur dioxide emissions:

Permittee shall monitor and calculate emissions on a consecutive twelve month rolling total as measured by the continuous emissions monitor (CEM) required pursuant to 40 CFR 75.

CHANGES TO PERMIT (REVISION 1): -*MINOR MODIFICATION V-03-043R1*

Louisville Gas & Electric Company submitted to the Division two minor revision applications on November 29, 2004 and December 21, 2004. The initial application was for a voluntary creditable decrease in emissions for the permitted emission unit 01, a 5333 mmBtu/hr, pulverized coal fired boiler installed in 1990. The creditable decrease in emissions will be 1485 tons per year of nitrogen oxide. This permit will limit the twelve (12) month rolling total for nitrogen oxides (NO_x) on the unit to 5556 tons per year. The credible reduction is requested by the facility to net against future potential increase from the construction of an additional utility boiler. The practically enforceable creditable reduction is being done in accordance with the recently revised new source review (NSR) rules. [401 KAR 51:001 and 401 KAR 51:017] Compliance with the emissions limit shall be demonstrated using continuous emission monitoring equipment and procedures required by 401 KAR 52:060 (acid rain program).

Emission Unit 01- Emission Limitations:

Pursuant to 401 KAR 51:001, Section 1, (146), source has accepted a voluntary limit such that consecutive twelve month rolling total of nitrogen oxide emissions shall not exceed 5556 tons per year, which through this permit is enforceable as a practical matter.

Compliance with nitrogen oxide emissions:

Permittee shall monitor and calculate emissions on a consecutive twelve month rolling total as measured by the continuous emissions monitor (CEM) required pursuant to 40 CFR 75.

The second application is for the proposed usage of two or three dry bulk trailers with tractors to transport the fly ash from the existing fly ash silo emission point 19 (2E and 2F) at the facility. The vehicle miles traveled (VMT) area assumed to neither decrease nor increase in the disposal process. The proposed trailers are capable of unloading into a barge in forty to sixty minutes; while offloading can be occur at a rate of twenty five to thirty five minutes. The fly ash will be discharged from the trailer through a cyclonic material handler, and flow by gravity into the barge. The airflow from the material handler will pass through a baghouse. With a throughput rate of one trailer load per hour, 35 tons per trailer from the loading operations, the allowable PM emission rate is 34.16 lb/hr however, the potential to emit from the process with the collector will be 0.17 lb/hr, and 0.10 lb/hr from the drop loading controlled by an extendable chute for particulate matter (PM/PM10). In order to meet the prevention of significant deterioration (PSD) requirements, the permittee requests that the allowable

rate for combined process should be limited to 0.027 lb/hr and 1.20 tons per year of PM/PM10 for the trailers transporting the fly ash. 401 KAR 59:010 is applicable to the proposed units however, the total particulate emissions from the units is below the five tons per, therefore the units will be considered as insignificant, and will be added to the list in the permit.

PAST PERMITING ACTION:

Louisville Gas & Electric Company is an existing source with coal fired and natural gas fired peaking units for electricity generation in Trimble County, Kentucky. The source has a draft Title V permit issued in 1997, which has undergone public/U.S.EPA review (12-18-1997) however, the final permit was not issued. An acid rain permit, which underwent public review (12-24-98), was issued for the boiler with NO_x averaging and SO_2 allowances in 1996 (AR-96-007); and revised NO_x averaging and SO_2 allowances permit issued on March 5, 1999 (A-98-011). In addition, the source submitted a permit application to construct and operate a natural gas fired peaking units, which were granted a PSD permit on June 22, 2001, after public/U.S.EPA review (5-17-2001). A Phase II acid rain application for the combustion turbines (CTs) received on June 12, 2001 has not been drafted or issued. Other than the new acid rain application for the combustion turbines, all three permit applications were called administratively complete on 12-12-1996 (draft TV permit), 12-24-1998 (first Title IV permit), and 01-14-01 (PSD permit) respectively.

The Division has decided to issue a source-wide proposed permit to incorporate the draft TV, PSD, existing acid rain permit for unit 1 and a Phase II draft permit for the CTs. The reason being that new CT units have no SO_2 allowances, which are yet to be purchased on the market. The acid rain section will be divided into two; the permitted unit one (1), with allowances and NO_x limits will be the initial part and while the second part addresses the CT's (units 25-30) with a draft watermark to indicate that the public has not reviewed this portion. The significant change for the entire permit is to give it a new permit number, which will affect the issuance date for the permitted acid rain for unit 1. Given the history above, the proposed permit with the numberV-02-043, will consolidates the authority of any previously issued preconstruction permit terms and conditions for various emission units and incorporates all requirements of those existing permits into one single permit for this source. For continuity, the most current log number and the completeness dates will be used as general numbers for this permit.

EMISSION AND OPERATING CAPS DESCRIPTION:
NA

OPERATIONAL FLEXIBILITY:
NA